

## [0084] CLAIMS

What is claimed is:

1. A method comprising compiling formatted video content into a binary format that includes one or more of layout, rendering, user interface (UI) interaction, and dynamic aspects of the formatted video content.

2. The method as defined in Claim 1, wherein:

the formatted video content includes an original markup language; and

the compiling further comprises processing the formatted video content in the original markup language with

a process that is specific to the original markup language; and

a process that is specific to a predetermined client for the rendering of the video content in the binary format so as to be consistent with the original markup language.

3. The method as defined in Claim 1, wherein:

the formatted video content includes source content in one or more formats; and

each said format is selected from the group consisting of an original markup language, a word processing document format, a spreadsheet format, a slideshow format, a database format, a drawing format, and an electronic mail (email) format.

4. The method as defined in Claim 1, further comprising:

translating the video content in the binary format with a serialized document object model into a deserialized document object model hierarchy corresponding to the video content of the original markup language; and

presenting the translated video content using the document object model hierarchy.

5. The method as defined in Claim 4, wherein the formatted video content includes an original markup language and the presenting includes:

the layout, rendering, UI interaction, and dynamic aspects of the video content from the original markup language; and

form elements, scrolling, navigation, and event handling defined in the video content from the original markup language.

6. The method as defined in Claim 4, wherein the formatted video content includes an original markup language, and:

the video content from the original markup language includes inline images and a shape within which the inline images are to be placed during the presenting; and

the presenting further comprises reflowing the inline elements within the shape consistent with a predetermined display resolution and size.

7. The method as defined in Claim 1, wherein the formatted video content includes an original markup language comprising Extensible Hypertext Markup Language (XHTML) with Cascading Style Sheets (CSS)

8. The method as defined in Claim 1, wherein the formatted video content includes an original markup language having one or more textual words that are translated into a plurality of languages and that are included in each of:

the original markup language; and

the binary format.

9. A computer-readable medium comprising instructions that, when executed, perform that method of Claim 1.

10. A computer-readable medium comprising instructions that when executed:  
capture the presentation results of an emulation of an interactive execution of a browser application processing video content in an original markup language, wherein the presentation includes layout, rendering, UI interaction, and dynamic aspects of the video content from the original markup language; and  
create one or more bit maps and corresponding drawings commands corresponding to the presentation results.

11. The computer-readable medium as defined in Claim 10, wherein the capture further comprises processing the video content in the original markup language with:  
a markup-specific routine that is specific to the original markup language; and  
a client-specific routine to specific to a predetermined client for the rendering of the one or more bit maps with the corresponding drawings commands so as to be consistent with the original markup language.

12. The computer-readable medium as defined in Claim 10, wherein the instructions, when executed:  
translate the one or more bit maps and corresponding drawings commands with a document object model into a document object model hierarchy corresponding to the video content of the original markup language; and

present the translated video content using the document object model hierarchy.

13. The computer-readable medium as defined in Claim 12, wherein the presenting includes:

the layout, rendering, UI interaction, and dynamic aspects of the video content from the original markup language; and

form elements, scrolling, navigation, and event handling defined in the video content from the original markup language.

14. The computer-readable medium as defined in Claim 13, wherein:

the video content from the original markup language includes inline images and a shape within which the inline images is to be placed during the presenting; and

the presenting further comprises reflowing the text within the shape consistent with a predetermined display resolution and size.

15. The computer-readable medium as defined in Claim 10, wherein the original markup language comprises XHTML+CSS.

16. The computer-readable medium as defined in Claim 10, wherein one or more textual words are translated into a plurality of languages and included in each of:

the video content in the original markup language; and

the one or more bit maps.

17. A method comprising:

receiving video content at a front end, the video content including XHTML and CSS;

pre-cascading the CSS using a CSS parser with the XHTML to generate a rendering-style record for each of a plurality of conditions that each of a plurality of display objects in the video content have for various interactive input;

forming a hierarchical tree of nodes, wherein the pre-cascading of the CSS provides a presentation for the hierarchical tree of nodes and the XHTML provides a structure for the hierarchical tree of nodes, wherein each said node is referenced to a corresponding said rendering-style record;

compiling the hierarchical tree of nodes into serialized binary data that includes, for each said node, information corresponding to the hierarchy and rendering-style record thereof;

transmitting the serialized binary data over a network;

receiving the serialized binary data from the network;

deserializing the received serialized binary data using a DOM to represent each said node of the hierarchical tree and the respective information corresponding thereto;

calculating a layout presentation for the nodes of the hierarchical tree, including sizing and reflow of the plurality of display objects against a predetermined size of the layout presentation; and

calling one or more draw functions to output the layout presentation.

18. A server-side for a headend performing from the method of Claim 17:

the receiving of the video content;

the pre-cascading;

the forming of the hierarchical tree of nodes, wherein each said node is referenced to a corresponding said rendering-style record;

the compiling; and

the transmitting.

19. A client performing from the method of Claim 17:

the receiving of the serialized binary data;

the deserializing;

the calculating; and

the calling.

20. A server-side for a headend, comprising:

a parser to parse video content in an original markup language into a Document Object Model (DOM) tree that includes layout, rendering, UI interaction, and dynamic aspects of the video content;

a transcoder to transcode the DOM tree into video content in a serialized byte-stream that includes the layout, rendering, UI interaction, and dynamic aspects of the video content from the original markup language; and

a network interface for transmitting communications containing the serialized byte-stream.

21. The server-side for a headend as defined in Claim 20, wherein the original markup language comprises XHTML+CSS.

22. A Multiple System Operation (MSO) comprising:

storage for video content in an original markup language that includes layout, rendering, UI interaction, and dynamic aspects of the video content; and

one or more headends each having one or more servers, wherein each said server includes a compiler to compile the video content in the original markup language into video content in a binary format that includes the layout, rendering, UI interaction, and dynamic aspects of the video content from the original markup language.

23. The MSO as defined in Claim 22, wherein the compiling comprises processing the video content in the original markup language with:

a markup-specific routine that is specific to the original markup language; and

a client-specific routine to specific to a predetermined client for the rendering of the video content in the binary format so as to be consistent with the original markup language.



24. The MSO as defined in Claim 22, wherein each said headend is for broadcasting on a network selected from the group consisting of:

- a cable television broadcasting network;
- a satellite television broadcasting network;
- an air wave broadcasting television network;
- a local area network;
- a wide area network; and
- the Internet.

25. The MSO as defined in Claim 22, wherein the original markup language comprises XHTML+CSS.

26. A client comprising:

- processing hardware; and
- memory including an operating system and one or more applications for execution by the processing hardware, wherein:

- a decoder application which, when executed by the processing hardware, decodes video content in a binary format with a document object model into a document object model hierarchy, wherein:

- the video content in the binary format includes layout, rendering, user UI interaction, and dynamic aspects of video content from an original markup language; and

the document object model hierarchy corresponds to the video content in the original markup language;  
a video output said application which, when executed by the processing hardware, presents the decoded video content using the document object model hierarchy.

27. The client as defined in Claim 26, wherein:  
the video content from the original markup language includes text and a shape within which the text is to be placed during the presenting; and  
the presenting of the decoded video content further comprises reflowing the text within the shape consistent with a predetermined display resolution and size.

28. The client as defined in Claim 26, wherein the presenting by the video output said application includes:  
the layout, rendering, UI interaction, and dynamic aspects of the video content from the original markup language; and  
form elements, scrolling, navigation, and event handling defined in the video content from the original markup language.

29. The client as defined in Claim 26 and selected from the group consisting of a set top box, a personal computer, a video game console, an automatic teller machine, a cellular telephone, and a computing device for which the processor hardware has a clock

speed of less than or equal to one-hundred (100) MHz and the memory is less than or equal to five (5) megabytes.

30. The client as defined in Claim 26, wherein the original markup language comprises XHTML+CSS.

31. A system comprising:

a transcoder to transcode video content in an original markup language into video content in a binary format that includes layout, rendering, UI interaction, and dynamic aspects of the video content from the original markup language;

a transport medium for transporting the video content in the binary format; and

a client to:

receive the video content in the binary format from the transport medium;

translate the video content in the binary format with a document object model into a document object model hierarchy corresponding to the video content of the original markup language; and

present the translated video content using the document object model hierarchy.

32. The system as defined in Claim 31, wherein:

the video content from the original markup language includes inline images and a shape within which the inline images are to be placed during the presenting; and

the presenting of the translated video content further comprises reflowing the inline images within the shape consistent with a predetermined display resolution and size.

33. The system as defined in Claim 31, wherein the transcoding comprises processing the video content in the original markup language with:

a markup-specific routine that is specific to the original markup language; and

a client-specific routine to specific to the client for the presenting of the translated video content in the binary format so as to be consistent with the original markup language.

34. The system as defined in Claim 31, wherein the presenting at the client includes:

the layout, rendering, UI-interaction, and dynamic aspects of the video content from the original markup language; and

form elements, scrolling, navigation, and event handling defined in the video content from the original markup language.

35. The system as defined in Claim 31, wherein the transport medium comprises a network selected from the group consisting of:

a cable television broadcasting network;

a satellite television broadcasting network;

a cellular telephone network;

a terrestrial analog or digital broadcasting television network;

a local area network (LAN);

a wide area network (WAN); and  
the Internet.

36. The system as defined in Claim 31, further comprising a server at a headend of an MSO, wherein the transcoder is included in the server.

37. A system comprising:

means for compiling:

from content in a complex markup language that includes dynamic layout, presentation, rendering, and user interface interaction; and

to serialized binary data that encodes the dynamic layout, presentation, rendering, and user interface interaction of the content;

client engine means, using the serialized binary data, for the dynamic layout, presentation, rendering, and user interface interaction of the content on a client.

38. The system as defined in Claim 37, wherein:

the client engine means comprises a DOM used to form a DOM hierarchy having a plurality of element; and

the plurality of elements in the DOM hierarchy have respective properties that can be used to perform the layout, rendering, and UI interaction at the client.

39. The system as defined in Claim 37, wherein the client is selected from the group consisting of a set-top box, a personal computer, a video game console, an automatic teller machine, a cellular telephone, and a computing device having processor hardware with a clock speed of less than twenty (20) MHz and having memory less than two (2) megabytes.

40. The system as defined in Claim 37, wherein the content in the complex markup language comprises XHTML+CSS.